

## CLAIMS

We claim:

- 5 1. A method for preventing alpha particle radiation from being emitted from radioactive material-containing waste material into an environment comprising:
- 10 admixing a polymer with the waste material to encapsulate the radioactive material within the polymer wherein the polymer prevents alpha particle radiation from passing through the polymer.
- 15 2. The method of Claim 1, wherein the radioactive material is radon.
3. The method of Claim 1, wherein the polymer is selected from mineral oil, charcoal, activated carbon, silicates, sulfur, organic polymers or inorganic polymers.
- 20 4. The method of Claim 1, wherein the polymer is added in an amount of from about 0.1 to about 30 percent by weight based on the amount of waste material.
- 25 5. The method of Claim 1, further comprising applying a polymer sealant to an exterior of the polymer/waste material admixture to further prevent alpha particles from being emitted into the environment.
- 30 6. The method of Claim 1, further wherein the admixture of polymer and waste material is admixed with a shielding material such that the polymer-waste material admixture is incorporated within the shielding material.
- 35 7. The method of Claim 6, wherein the shielding material is selected from ceramic, enamel, concrete or metal.

8. The method of Claim 6, wherein the amount of shielding material admixed with the polymer-waste material admixture is in a ratio of from about 2 to 1.

9. The method of Claim 6, further wherein the admixture of the shielding material and the polymer/waste material admixture is formed into a geometric shape having a high volume per unit surface area.

10. The method of Claim 9, wherein the geometric shape is selected from a substantially spherical shape or a substantially cubic shape.

11. The method of Claim 6, further comprising applying a polymer sealant to an exterior of the admixture of shielding material and the polymer/waste material admixture to further prevent alpha particles from being emitted into the environment.

12. A method of reducing alpha particle radiation from emitting from radioactive material-containing waste material comprising:

forming the waste material into a geometric shape having a high volume per unit surface area.

13. The method of Claim 12, wherein the radioactive material is radon.

14. The method of Claim 12, wherein the geometric shape is selected from a substantially spherical shape or a substantially cubic shape.

15. The method of Claim 12, wherein the waste material is admixed with a shielding material prior to forming into the geometric shape.

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16. The method of Claim 15, wherein the shielding material is selected from ceramic, enamel, concrete or metal.

17. The method of Claim 15, further comprising applying a polymer sealant to an exterior of the shielding material/waste material admixture to further prevent alpha particles from being emitted into the environment.

18. The method of Claim 12, wherein, subsequent to the admixing of the shielding material, a polymer material is admixed with the waste material to encapsulate the radioactive material within the polymer wherein the polymer prevents alpha particle radiation from passing through the polymer.

19. The method of Claim 18, wherein the polymer is selected from mineral oil, charcoal, activated carbon, silicates, sulfur, organic polymers or inorganic polymers.

20. The method of Claim 18, wherein the polymer is added in an amount of from about 0.1 to about 30 percent by weight based on the amount of waste material.

21. The method of Claim 18, further comprising applying a polymer sealant to an exterior of the admixture of shielding material and the polymer/waste material admixture to further prevent alpha particles from being emitted into the environment.

22. A method for preventing alpha particle radiation from being emitted from radioactive material-containing waste material into an environment comprising:

admixing a polymer with the waste material to form a first admixture, wherein the polymer encapsulates the radioactive

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material and prevents alpha particle radiation from passing through the polymer;

admixing the first admixture with a shielding material to form a second admixture, wherein the first admixture is incorporated within the second admixture; and

forming the second admixture into a geometric shape having a high volume per unit surface area.

23. The method of Claim 22, wherein the radioactive material is radon.

24. The method of Claim 22, wherein the polymer is selected from mineral oil, charcoal, activated carbon, silicates, sulfur, organic polymers or inorganic polymers.

25. The method of Claim 22, wherein the polymer is added in an amount of from about 0.1 to about 30 percent by weight based on the amount of waste material.

26. The method of Claim 22, wherein the shielding material is selected from ceramic, enamel, concrete or metal.

27. The method of Claim 22, wherein the amount of shielding material admixed with the polymer-waste material admixture is in a ratio of from about 2 to 1.

28. The method of Claim 22, wherein the geometric shape is selected from a substantially spherical shape or a substantially cubic shape.

29. The method of Claim 22, further comprising applying a polymer sealant to an exterior of the second admixture of shielding material and the polymer/waste material admixture to further prevent alpha particles from being emitted into the environment.

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